

INDEX

- Adaptive management, **6-40**, 9-33
- Aggradation
 - regression functions, 7-60
- Agriculture
 - vegetative clearing, 3-14
 - hypothetical condition and restoration response, 8-92
 - instream modifications, 3-14
 - irrigation and drainage, 3-15
 - restoration, 8-89
 - sediment and contaminants, 3-16
 - soil exposure and clearing, 3-15
- Alternatives
 - design, 5-17
 - restoration alternatives, **5-17**
 - supporting analyses, 5-22
- Aquatic habitat, 2-68
 - subsystems, 2-68
- Aquatic vegetation, 2-72
 - algae, 7-90
- Backwater
 - computation, 7-25
 - effects, 7-24
- Bank stability, 7-62
 - bank erosion, 8-52
 - bank stability check, 8-51
 - charts, 7-65
 - critical bank heights, 7-66
 - protection measures, 8-51
 - qualitative assessment, 7-62
 - quantitative assessment, 7-64
- Bank stabilization, 8-50, 8-70
 - anchored cutting systems, 8-71
 - geotextile systems, 8-71
 - trees and logs, 8-72
- Bank restoration, 8-67
 - inspections, 9-25
- Bankfull discharge, **1-19**, 7-11
 - field indicators, 7-11
- Benthic invertebrates, 2-73
 - benthic rapid bioassessment, 7-91
- Beaver
 - ecosystem impacts, 8-29
 - impact of dams, 2-67
 - transplanting, 8-29
- Biological diversity
 - complexity, 7-87
 - evaluating indices, 7-93
 - in developing goals and objectives, 5-6
 - Index of Biotic Integrity, 7-89
 - measures of diversity, 7-88
 - spacial scale, 7-88
 - standard of comparison, 7-92
 - subsets of concern, 7-87
- Buffers, 8-13
 - multispecies riparian buffer system, 8-90
 - urban stream buffers, 8-15
- Channel, **1-13**,
 - equilibrium, 1-16
 - scarp, **1-15**
 - size, 1-15
 - thalweg, **1-15**

- Channel form, 1-29
 - anastomosed streams, **1-30**
 - braided streams, **1-30**
 - predicting stable type, 8-33
- Channel incision, 1-23
- Channel slope, **2-26**
 - longitudinal profiles, 2-26
- Channel cross section, 2-27
 - composite and compound cross sections, 7-24
 - field procedures, 7-25
 - site/reach selection, 2-28, 7-25
- Channel evolution models, **7-34**
 - advantages of, 7-38
 - applications of geomorphic analysis, 7-40
 - limitations of, 7-40
- Channel-forming (or dominant) discharge, **1-18**, 7-3, 7-9
 - determining from recurrence interval, 7-5, 7-13
 - determining from watershed variables, 7-15
 - mean annual flow, 7-16
- Channel models, 8-45
 - computer models, 8-46
 - physical models, 8-46
- Channel restoration, 8-31
 - dimensions, 8-36, 8-40
 - inspection, 9-25
 - maintenance, 9-28
 - moving beds, known slope, 8-42
 - moving beds, known sediment concentration, 8-43
 - reconstruction procedures, 8-31
 - reference reach, **8-36**
 - shape, 8-48
- Channel roughness, 2-28
 - formation of aquatic habitat, 2-29
 - in meandering streams, 2-29
- Channel stability
 - bank, 7-56
 - bed, 7-56
 - local, 7-56
 - systemwide, 7-56
- Channel widening, 7-65
 - predictions, 7-67
- Channelization and diversions, 3-10
 - restoration design, 8-88
- CompMech (compensatory mechanisms), 7-101
 - use with PHABSIM, 7-101
- Conditions in stream corridor, 4-20
 - causes of impairment, 4-22
 - condition continuum, 4-23
 - management influence, 4-28
- Conduit function, 2-92
- Connectivity and width, **2-88**, 8-4
 - reference stream corridor, 8-6
 - restoration design, 8-21
- Conservation easements, 6-7
- Cost components and analysis, 5-25
 - benefits evaluation, 5-29
 - cost-effectiveness analysis, **5-26**
 - data requirements, 5-25
 - decision making, 5-28
 - estimations, 6-31
 - incremental cost analysis, **5-27**
- Cross section surveys, 7-59
- Dams

- as a disturbance, 3-7
 - best management practices, 8-86
 - Glen Canyon Dam spiked flow experiment, 3-9
 - removal, 8-86
- Data analysis and management, 7-79
 - costs, 6-31
 - data analysis and interpretation, **6-33**
- Degradation
 - regression functions, 7-60
- Design, **8-1**
- Discharge, **1-18**,
 - continuity equation, **7-18**
 - design discharge for restoration, 8-32
 - measurement, 7-27
- Dynamic equilibrium, **2-96**
- Disturbance, 2-97, 3-1
 - Arnold, MO flood, 3-5
 - biological, 3-6, 7-107
 - broad scale, 3-2
 - causal chain of events, 3-1
 - chemical, 3-6
 - natural disturbances, 3-3
 - physical, 3-6
- Ecosystem
 - internal/external movement model, 1-4
 - stream-riparian, 2-61
 - relationship between terrestrial and aquatic ecosystems, 2-84
 - river floodplain, 2-61
- Effective discharge, **1-19** , 7-14
- Erosion, **2-19**, 2-32,
 - control of, 2-32, 9-4
- Environmental impact analysis, 5-30
- Eutrophication, **2-83**
- Evaluation, **6-37**, 6-43
 - fish barrier modifications, 9-37
 - human interest, 9-40, 9-50
 - monitoring techniques, 9-33
 - parameters, 9-34
 - reference sites, 9-39
- Evaporation, 2-7
- Evapotranspiration, **2-6**
- Exotic species, 3-11
 - control, 8-89
 - salt cedar, 3-12
 - Western U.S., 3-11
- Fauna
 - aquatic fauna, 2-72
 - beaver (*see Beaver above*)
 - benthic invertebrates, 2-73
 - birds, 2-66
 - fish, 2-74-76
 - habitat features, 2-65
 - mammals, 2-66
 - mussels, 2-76
 - reptiles and amphibians, 2-66
- Filter and barrier functions, 2-93
 - edges, 2-95
- Fish, 2-74
 - bioindicators, 7-92
 - feeding and reproduction strategies, 2-75
 - managing restoration, 9-49
 - species richness, 2-74
- Floodplain, **1-13**,

- hydrologic floodplain, **1-20**
- topographic floodplain, **1-20**
- flood storage, 1-20
- lag time, **1-20**
- lateral accretion, **2-30**
- stability, 2-24
- vertical accretion, **2-30**
- Floodplain landforms and deposits, 1-21
 - backswamps, **1-21**
 - chute, **1-21**
 - clay plug, **1-21**
 - meander scroll, **1-21**
 - natural levees, **1-21**
 - oxbow, **1-21**
 - oxbow lake, **1-21**
 - restoration of microrelief, 8-7
 - splays, **1-21**
- Flood-pulse concept, 1-24
- Flow
 - allowable velocity check, 8-53, 8-56
 - allowable stress check, 8-53, 8-56
 - baseflow, **1-16**, 2-15
 - daily mean streamflow, 7-6
 - ecological impacts, 2-17
 - ephemeral streams, **1-18**
 - effluent or gaining reaches, **1-18**
 - impact on fauna, 2-77
 - influent or "losing" reaches, **1-18**
 - intermittent streams, **1-18**
 - mean annual flow, **7-16**
 - peak flow, 7-6
 - perennial streams, **1-18**,
 - stormflow, **1-16**
 - sources of data, 7-6
 - uniform flow, **7-21**
- Flow duration, **2-16**
 - flow duration curve, 7-4
- Flow frequency, **2-16**, **7-5**
 - flood frequency analysis, 7-5, 7-7
 - low-flow frequency analysis, 7-7
- Food patches, 8-28
- Forests and forestry
 - buffer strips, 8-98
 - managing restoration, 9-45
 - site preparation, 3-18
 - transportation, 3-18, 8-95
 - tree removal, 3-17
- Functions, **2-87**
 - barrier, **2-87**
 - conduit, 1-9, **2-87**
 - filter, **2-87**, 8-22
 - habitat, **2-87**
 - sink, **2-87**
 - source, **2-87**
- Funding,
 - organization, 4-10
 - restoration implementation, 6-3
- Geomorphic assessment, **7-29**
- Geomorphology, **2-19**
- Goals and Objectives, 5-11, 5-16
 - desired future conditions, **5-3**, 5-12
 - responsiveness, **5-13**
 - restoration constraints and issues, **5-7**

- restoration goals, **5-11**
- restoration objectives, **5-16**
- scale considerations, 5-3
- self-sustainability, **5-13**
- tolerance, **5-13**
- value, **5-13**
- vulnerability, **5-13**
- Grazing
 - loss of vegetative cover, 3-19
 - physical impacts, 3-20
 - restoration, 8-101, 9-46
- Greentree reservoirs, 8-27
- Ground water
 - aquifer, **2-12**
 - aquitards, **2-12**
 - capillary fringe, **2-11**
 - confined aquifer, **2-12**
 - pellicular water, **2-11**
 - phreatic zone, **2-12**
 - recharge area, **2-12**
 - springs, seeps, **2-12**
 - unconfined aquifer, **2-12**
 - vadose zone, **2-11**
- Habitat Evaluation Procedures (HEP), 7-97
- Habitat functions, 2-89
 - edge and interior, 2-90, 8-22
- Habitat Recovery (*instream*), 8-77
 - procedures, 8-78
- Hydraulic geometry
 - channel planform, 7-54
 - hydraulic geometry curves Salmon River, 7-47
 - hydraulic geometry theory, **7-45**, 8-39
 - hydraulic geometry formulas, 8-40
 - meander geometry, 7-53, 7-54, 7-55
 - regime formulas, 7-51
 - regime theory, 7-48
 - regional curves, 7-49
 - relations based on mean annual discharge, 7-46
 - stability assessment, 7-48
- Hydrologic cycle, **2-3**
- Hydrologic unit cataloging, 1-10
- Indicator species, **7-84**
 - aquatic invertebrates
 - habitat evaluation procedures, 7-84
 - riparian response guilds, 7-86
 - selecting indicators, 7-85
- Infiltration, **2-8**
 - infiltration capacity, **2-8**
 - infiltration rate, **2-8**
 - porosity, **2-8**
- Implementing restoration
 - construction, 9-12
 - flow diversion, 9-14
 - maintenance, 9-27
 - minimizing disturbance, 9-4
 - plant establishment, 9-16
 - site preparation, 9-3, 9-10
- Instream Flow Incremental Methodology (IFIM), 5-23, 7-98,
- Instream structures, 8-79
 - design, 8-80
 - engineered log jams, 9-31
 - inspection, 9-25
- Interception, 2-4

- precipitation pathways, 2-5
- Landscape scale, **1-8**
 - in goals and objective development, 5-4
- Land use
 - design approaches for common effects, 8-85
 - developing goals and objectives, 5-5
 - summary of disturbance activities, 3-27
- Longitudinal zones, 1-26
- Longitudinal profile, 2-27, 8-48
 - adjustments, 2-27
- Managing restoration, 9-43
- Manning's equation, **7-19**
 - direct solution for Manning's n, 7-19
 - Froude number, **7-24**
 - indirect solution for Manning's n, 7-19
 - Manning's n in relation to bedforms, 7-24
- Monitoring, 6-23
 - acting on results, 6-38
 - dissemination of results, 6-41
 - documenting and reporting, 6-40
 - inspection, 9-22
 - monitoring plan, 6-24, 6-26, **6-31**, 6-36
 - performance criteria, **6-27**
 - level of effort, 6-34
 - parameters, and methods, 6-27
 - target conditions, **6-27**
 - types of data, 6-33
- Montgomery and Buffington classification system, 7-32
- Mining
 - altered hydrology, 3-22
 - contaminants, 3-22
 - reclamation, 8-104
 - soil disturbance, 3-21
 - vegetative clearing, 3-21
- Nest structures, 8-27
- Oak Ridge Chinook salmon model (ORCM), 7-103
- Organic material, 2-82
 - autochthonous, **1-35**, **2-82**
 - allochthonous, **1-33**, **2-82**
 - heterotrophic, **1-33**
- Organizing restoration
 - advisory group, **4-4**
 - boundary setting, 4-3
 - commitments, 6-11
 - contractors, 6-10
 - characteristics of success, 6-18
 - decision maker, **4-4**
 - decision structure, 4-10
 - dividing responsibilities, 6-6, 6-8
 - documentation, 4-14
 - information sharing, 4-11
 - permits, 6-13
 - schedules, 6-12
 - scoping process, 40-3
 - sponsor, **4-4**
 - technical teams, 4-8, 6-8
 - tools, 6-3
 - volunteers, 6-9
- Overland flow, **2-13**
 - depression storage, **2-13**
 - Horton overland flow, **2-14**
 - surface detention, **2-14**
- Physical Habitat Simulation Model (PHABSIM), 7-98

- time series simulations, 7-101
- use with CompMech, 7-102
- Physical structure
 - corridor, **1-5**,
 - patch, **1-5**,
 - matrix, **1-5**, 1-8,
 - mosaic, **1-5**,
- Pools and riffles, **1-31**, 2-26
 - rifle spacing, 8-48
- Problem/opportunities identification, 4-19
 - baseline data, **4-18**
 - community mapping, **4-18**
 - data analysis, 4-20
 - data collection, 4-17
 - historical data, **4-18**
 - problem/opportunity statements, **4-28**
 - reference condition, **4-21**
 - reference reach, **4-22**
 - reference site, **4-22**
 - statements, 4-28
- Proper Functioning Condition (PFC), 7-43
- Public outreach, 4-11
 - tools, 4-12
- Quality assurance and quality control
 - costs, 6-31
 - restoration planning, 5-8
 - sampling, 7-80
- Rapid bioassessment, 7-90
- Reach file/National Hydrography Dataset, 1-10
- Reach scale, 1-11
 - in developing goals and objectives, 5-7
- Recovery, **2-97**
- Recreation, 3-23
 - restoration design, 8-106
- Regional hydrological analysis, 7-16
- Regional scale, 1-7
- Resistance, **2-97**
- Resilience, **2-97**
 - in Eastern upland forests, 3-4
- Riffles (*see Pools and riffles*)
- Risk assessment, 5-29, 6-43
- River continuum concept, 1-33
- Riverine Community Habitat Assessment and Restoration Concept Model (RCHARC), 7-101
- Rosgen stream classification system, 7-34
- Runoff, **2-12**
- Quick return flow, **2-15**
- Salmonid population model (SALMOD), 7-103
- Sampling
 - automatic, 7-72
 - chain of custody, 7-77
 - discrete versus composite, 7-73
 - field analysis, 7-74
 - field sampling plan, **6-32**
 - frequency, 7-69, 6-34
 - grab, 7-71
 - labeling, 7-76
 - laboratory sample analysis, **6-33**
 - manual, 7-71
 - packaging and shipping, 7-77
 - preparation and handling, 7-75
 - preservation, 7-76
 - site selection, 7-70
 - timing and duration, 6-34

- Saturated overland flow, **2-15**
- Scarp, **1-15**
- Schumm
 - classification system, 7-32
 - equation, 2-25
- Sediment
 - ecological and water quality impacts, 2-32
- Sediment deposition, **2-19**
- Sediment sampling
 - analysis, 7-79
 - collection techniques, 7-78
- Sediment transport, **2-19**, 8-58
 - bed load, **2-22**
 - bed-material load, **2-22**, 2-23
 - budget, 8-61
 - discharge functions, 8-59
 - HEC-6, 8-59
 - impact on habitat, 2-31
 - impact on water quality, 2-31
 - measured load, **2-22**
 - particle movement, **2-21**
 - processes, 7-62
 - saltation, **2-21**
 - sediment load, **2-22**
 - sediment rating curve, 7-15, 8-32
 - stream competence, **2-20**
 - stream discharge, **2-22**
 - stream power, **2-13**, 8-57
 - suspended bed material load, **2-22**
 - suspended load, **2-21**, 2-22
 - suspended sediment discharge, **2-22**
 - tractive (shear) stress, **2-20**, 8-41, 8-53, 8-56
 - unmeasured load, **2-22**
 - wash load, **2-22**, 2-23
- Single-thread streams, 1-29
- Sinuosity, **1-31**
 - affecting slope, 2-26
 - meander design, 8-34, 8-37
- Site access, 6-16, 9-3
 - access easement, **6-16**
 - drainage easement, **6-16**
 - fee acquisition, **6-16**
 - implementation easement, **6-16**
 - right of entry, **6-16**
- Species requirements, 7-96, 8-7
- Specific gauge analysis, 7-58
- Soil
 - compaction, 8-10
 - ecological role of, 2-59
 - depleted matrix, **2-56**
 - functions, 2-52
 - hydric soils, 2-54
 - microbiology, 2-52, 2-59, 8-10
 - salinity, 8-10
 - soil surveys, 8-9
 - topographic position, 2-53
 - type, 2-51
 - wetland, 2-54
- Soil bioengineering, 8-26, 8-67
- Soil moisture, 2-9
 - evaporation, 2-6
 - deep percolation, **2-10**
 - field capacity, **2-9**

- permanent wilting point, **2-10**
 - relationship with temperature, 2-54
- Source and sink functions, 2-95
- Spatial scale, **1-3**,
 - landscapes, **1-8**
 - region, **1-7**
 - reach, **1-11**
 - watershed, **1-9**
- Stability (in stream and floodplain), 2-24, 2-97
 - assessment, 8-49
 - controls, 8-64
- Storm hydrograph, **1-17**
 - after urbanization, 1-17
 - recession limb, **1-17**
 - rising limb, **1-17**
- Stream classification, **7-29**, 7-94
 - applications of geomorphic analysis, 7-40
 - advantages, 7-30
 - alluvial vs. non-alluvial, **7-29**
 - limitations, 7-30
 - use in restoring biological conditions, 7-95
- Stream corridor, **1-1**
 - adjustments, 2-24
 - common features, 1-14
- Stream corridor scale, **1-11**
 - in developing goals and objectives, 5-6
- Stream health
 - visual assessment, 7-84
- Stream instability, 7-55
 - bed instability, 7-57
 - local, 7-56
 - systemwide, 7-56
- Stream order, **1-29**
 - as a classification system, 7-31
 - stream continuum concept, 1-33
- Stream scale, **1-11**
- Stream stability (balance), 1-15, 2-25
- Stream system dynamics, 7-54
- Substrate, 2-80
 - bed material particle size distribution, 7-26, 8-31
 - hyporheic zone, 2-81
 - pebble count, **7-26**
 - vertical (bed) stability
- Subsurface flow, **2-15**
- Temporal scale, 1-12
- Terrace, **1-22**
 - formation, 1-23
 - numbering, 1-23
- Thalweg, **1-15**
 - profiles, 7-59
 - surveys, 7-58
- Transitional upland fringe, **1-13**, 1-22
- Transpiration, **2-6**
- Two-dimensional flow modeling, 7-100
- Urbanization, 3-24
 - altered channels, 3-25, 8-107
 - altered hydrology, 3-25, 8-107
 - design tools, 8-110
 - habitat and aquatic life, 3-26
 - inspection program, 9-27
 - runoff controls, 8-108
 - sediment controls, 8-109
 - sedimentation and contaminants, 3-26

Valley form, 8-4

Vegetation

- across the stream corridor, 1-24
- along the stream corridor, 1-32
- canyon effect, 2-62
- distribution and characteristics, 1-23, 1-32, 2-60
- flooding tolerances, 7-106, 8-24
- horizontal complexity, 2-63, 8-21
- internal complexity (diversity), 2-63
- landscape scale, 2-61
- structure, 2-63
- stream corridor scale, 2-62
- vertical complexity (diversity), 2-63, 8-23
- zonation, 7-106

Vegetation-hydroperiod modeling, 7-104

- use in restoration, 8-25

Vegetation restoration, 8-17

- existing vegetation, 8-14
- inspection, 9-25
- maintenance, 9-29
- restoration species, 8-13
- revegetation, 8-19, 9-16

Water surface

- energy equation, **7-22**
- profile, 7-21
- slope survey, 7-25

Water temperature, 2-32

- effects of cover, 2-79
- impacts of surface versus ground water pathways, 2-33
- impacts on fauna, 2-77
- sampling, 7-75
- thermal loading, 2-33

Water quality

- acidity, 2-34-36
- alkalinity, 2-34-36
- biochemical oxygen demand (BOD), 2-37
- dissolved oxygen, 2-36, 2-79, (*sampling*) 7-75
- iron, 2-34
- metals, 2-50
- nitrogen, 2-41
- pH, 2-34, 2-80, (*sampling*) 7-75
- phosphorus, 2-40
- restoration implementation, 9-6
- salinity, 2-34
- toxic organic chemicals, 2-43

Watershed, **1-28**

- designing for drainage and topography, 8-7
- drainage patterns, 1-28
- watershed scale, 1-11

Wetlands, **2-69**

- functions, 2-70
- hydrogeomorphic approach, **2-71**
- National Wetlands Inventory, 2-70
- palustrine wetlands, **2-71**
- plant adaptation, 2-56
- USFWS Classification of Wetlands and Deepwater Habitats of the United States, 2-70

Width (*see Connectivity and width*)